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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/714,851
Filing Date: November 18, 2003
Appellant(s): ARAKAWA, SATOSHI

Dion R. Ferguson (59,561)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 24 May 2007 appealing from the Office action mailed 14 April 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner.

Issue C: *Claims 8 and 9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as*

to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

<u>*Issue D:*</u> *Claims 8 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention.*

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,780,376	NAKAMURA	10-1988
5,043,991	BRADLEY	8-1991
5,517,034	NEYENS *et al.*	5-1996

Research Disclosure 308117 (Read-out of photostimulable latent fluorescent images, December 1989, 3 pages).

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

<u>*Issue A:*</u> *Claims 1, 2, and 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (US 4,780,376) in view of Neyens et al. (US 5,517,034) and Bradley (US 5,043,991).*

It should be noted that the specification discloses (pg. 5, lines 8-17) that "Said rate of change δ_o of the intensity of the stimulated emission to a given change of the wavelength of the stimulating light is a value obtained by dividing the inclination α_o of a tangent at a particular wavelength λ_o of a curve F representing the relation between the wavelength λ of the stimulating light and the intensity G

of the stimulated emission emitted from the radiation image convertor panel exposed to a certain amount of stimulating light by the intensity G_0 of the stimulated emission at the particular wavelength λ_0 as shown in FIG. 3. That is, $\delta_0 = \alpha_0/G_0$". It is important to recognize that the inclination α_0 of a tangent at the maximum of the stimulation spectrum is zero and thus the rate of change of the intensity of the stimulated emission to a given change of the wavelength of the stimulating light is $\delta_0 = \alpha_0/G_0 = 0$. Thus, stimulating light having a wavelength at the peak or maximum of the stimulation spectrum have a $\delta_0 = 0$ that is not larger than 0.5%/nm and is not smaller than -0.5%/nm.

In regard to claims **1**, **2**, and **4-7**, Nakamura discloses (column 8, lines 1-66) a radiation image read-out apparatus which comprises:

(a) a radiation image converter panel (13 in Fig. 5), wherein the radiation image converter panel (13) has a stimulable phosphor layer formed of alkali halide stimulable phosphors represented by formula MX:A, wherein M represents <u>at least one</u> of K, Rb and Cs, X represents <u>at least one</u> of Cl, Br and I, and A represents Eu^{2+} or Tl^{+} (column 3, line 59 to column 4, line 2);

(b) a stimulating light projecting means (14 in Fig. 5) which projects stimulating light onto the radiation image converter panel (13); and

(c) a detecting means (15 in Fig. 5) which detects stimulated emission emitted from the radiation image converter panel (13) upon exposure to the stimulating light beam and reads out a radiation image recorded on the radiation image converter panel (13).

The apparatus of Nakamura lacks an explicit description that the stimulating light projecting means includes wavelength fluctuations due to internal heating and that the stimulating light projecting means projects, onto the radiation image converter panel, stimulating light in a wavelength range where the rate of change of the intensity of the stimulated emission to a given change of the wavelength of the stimulating light is not larger than 1.0%/nm (or 0.5%/nm) and is not smaller than -1.0%/nm (or -0.5%/nm). However, Nakamura also discloses a stimulation spectrum (Fig. 1) of an alkali halide stimulable phosphor (*i.e.*, MX:A wherein M = Cs and Rb, X = Cl and Br, and A = Eu^{2+}; column 5, lines 6-21) that illustrates the relative stimulated emission intensity as a function of stimulation wavelength.

FIG. I

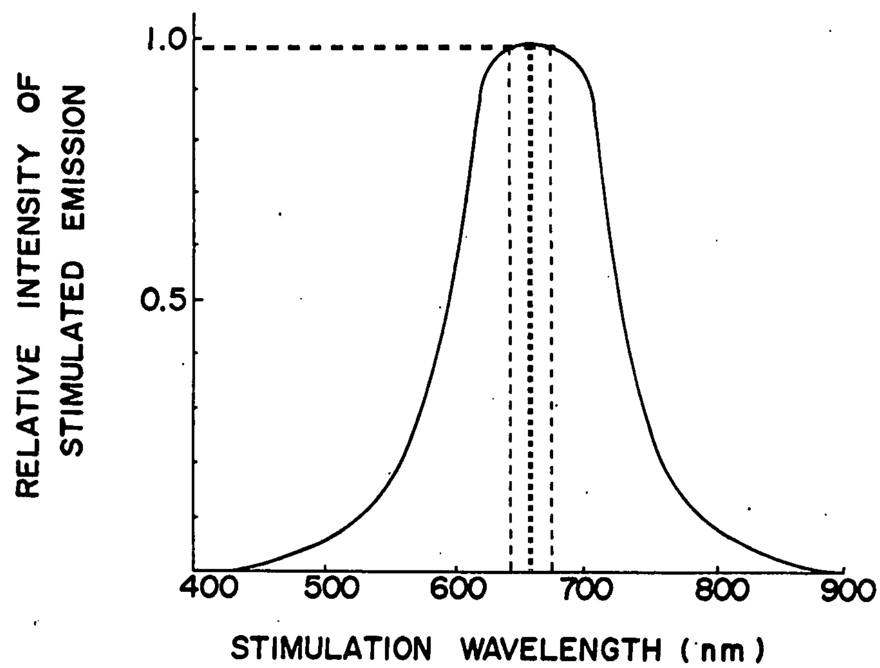

Fig. 1 of Nakamura with <u>lines added</u> to show the range of stimulation wavelengths wherein the stimulated emission intensities are within 99.5% of the peak stimulated emission intensity (I_{EM-max}).

Thus Nakamura teaches a peak stimulated emission intensity ($I_{em\text{-}max}$) when the alkali halide stimulable phosphor is stimulated at the stimulation wavelength $\lambda_{s\text{-}max}$. It is also clear from Fig. 1 of Nakamura that the stimulated emission intensity changes less than 0.5% (relative to the peak stimulated emission intensity $I_{em\text{-}max}$) when the stimulation wavelength is changed ±2.5 nm (from the stimulation wavelength $\lambda_{s\text{-}max}$). That is, wavelength fluctuations within ±2.5 nm from the stimulation wavelength $\lambda_{s\text{-}max}$ have a rate of change of the intensity of the stimulated emission to a given change of the wavelength of the stimulating light that is not larger than 0.5%/nm and is not smaller than -0.5%/nm for the alkali halide stimulable phosphor of Nakamura. Nakamura further discloses (column 6, lines 37-55) that a source of stimulating rays (such as a semiconductor laser) having a wavelength (preferably within the range of 600-750 nm) is suitably selected according to the purpose. Since Nakamura does not disclose and/or require a specific criteria for selecting a semiconductor laser that provides the stimulating wavelength, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified semiconductor laser selection criteria of Nakamura as any one of the known conventional criteria for selecting one or more of the known conventional semiconductor lasers that would not require further description. Further, Neyens *et al.* teach (column 1, lines 46-60; column 2, lines 51-57) a stimulating light projecting means for projecting onto the radiation image converter panel, a stimulating light at an optimal wavelength for photostimulation. Thus, one of the known conventional criteria for selecting a stimulating wavelength is to optimize (*i.e.*, maximize) photostimulation by stimulating at the wavelength of the peak or maximum of the

stimulation spectrum. In addition, Bradley teaches (column 1, line 64 to column 2, line 2) that even the best stabilized lasers have a drift of about 50 Å (*i.e.*, 5 nm) over the normal range of operating temperatures. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a known conventional laser (*e.g.*, a stabilized semiconductor laser having a laser wavelength located at the maximum of the stimulation spectrum and wherein the laser wavelength drifts ≤5 nm with operating temperature, in order to optimize photostimulation of the radiation image converter panel) as the unspecified laser in the apparatus of Nakamura.

Issue B: *Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (US 4,780,376) in view of Neyens et al. (US 5,517,034) and Bradley (US 5,043,991) as applied to claim 1 above, and further in view of Research Disclosure 308117 (Read-out of photostimulable latent fluorescent images, December 1989, 3 pages).*

In regard to claim **3** which is dependent on claim 1, the modified apparatus of Nakamura lacks that the stimulating light projecting means comprises a plurality of stimulating light sources which emit stimulating light of different wavelengths and projects synthesized stimulating light including the stimulating light of different wavelengths onto the radiation image converter panel so that the stimulating light of different wavelengths are simultaneously projected on the same position on the radiation image converter panel. Research Disclosure 308117 teaches (pg. 3) to provide a stimulating light projecting means comprising a plurality of stimulating light sources which emit light of different wavelengths and projects synthesized light

including the light of different wavelengths onto the radiation image converter panel so that the light of different wavelengths are simultaneously projected on the same position on the radiation image converter panel and wherein the synthesized light includes light of a difference-frequency, in order to photostimulate at the stimulation maximum of the radiation image converter panel. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a plurality of stimulating light sources in the modified apparatus of Nakamura, in order to obtain the optimal wavelength for photostimulation of the radiation image converter panel.

(10) Response to Argument

Issue A (arguments on pp. 9-14 of appeal brief filed 24 May 2007):

Appellant argues (first paragraph on pg. 9 to second paragraph on pg. 11) that Neyens *et al.* do not teach or suggest a relationship between a change in wavelength of a stimulating light and the change in intensity of the stimulable emission. Examiner respectfully disagrees. First it should be noted that a stimulating spectrum (see, *e.g.*, Fig. 1 of Nakamura) is simply a plot of emission intensity (*e.g.*, I_{em} in Figs. 1 and 2 of Neyens *et al.*) versus excitation wavelength (*e.g.*, λ_s in Figs. 1 and 2 of Neyens *et al.*). Therefore, both Nakamura and Neyens *et al.* expressly illustrate a relationship (*i.e.*, stimulating spectrum) between a change in stimulating light wavelength (λ_s) and a change in stimulable emission intensity (I_{em}). As discussed above, Fig. 1 of Nakamura teaches that wavelength fluctuations within ±2.5 nm from the stimulation wavelength $\lambda_{s\text{-}max}$ have a rate of change of the intensity of the stimulated emission to a given change of the wavelength of the stimulating light that is not larger than 0.5%/nm and is

not smaller than -0.5%/nm for an alkali halide stimulable phosphor (*i.e.*, MX:A wherein M = Cs and Rb, X = Cl and Br, and A = Eu^{2+}). Similarly, Fig. 1 of Neyens *et al.* teaches (since the stimulating spectra have relatively flat tops within ±2.5 nm of the stimulation wavelength $\lambda_{s\text{-}max}$) that wavelength fluctuations within ±2.5 nm from the stimulation wavelength $\lambda_{s\text{-}max}$ have a rate of change of the intensity of the stimulated emission to a given change of the wavelength of the stimulating light that is not larger than 0.5%/nm and is not smaller than -0.5%/nm for a stimulable phosphor. Further, it is noted that appellant states (second paragraph on pg. 11) that Neyens *et al.* focus "on finding and using a maximum in a stimulating spectrum". Thus appellant appears to agree that Neyens *et al.* teach a stimulating light projecting means for projecting onto the radiation image converter panel, a stimulating light at an optimal wavelength for photostimulation (*i.e.*, at a maximum in a stimulating spectrum). Therefore, both Nakamura and Neyens *et al.* illustrate a relationship (*i.e.*, stimulating spectra) between a change in stimulating light wavelength (λ_s) and a change in stimulable emission intensity (I_{em}) wherein the "rate of change of the intensity of the stimulated emission to a given change of the wavelength of the stimulating light is not larger than 1.0%/nm and is not smaller than -1.0%/nm" within ±2.5 nm of a maxima (*i.e.*, $\lambda_{s\text{-}max}$).

Appellant argues (last paragraph on pg. 11) that neither Neyens *et al.* nor Bradley teach or suggest a relationship between a change in intensity of the stimulable emission and the change in wavelength of the stimulating light. Examiner respectfully disagrees. As discussed above, both Nakamura and Neyens *et al.* teach or suggest that the "rate of change of the intensity of the stimulated emission to a given change of the wavelength of

the stimulating light is not larger than 1.0%/nm and is not smaller than -1.0%/nm" within ±2.5 nm of a stimulating spectrum maxima (*i.e.*, $\lambda_{s\text{-}max}$).

In response to Appellant's argument (second paragraph on pg. 12 to last paragraph on pg. 13) that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, there is some teaching, suggestion, or motivation to do so found in the references themselves. Nakamura also discloses (column 6, lines 37-55) that a source of stimulating rays (such as a semiconductor laser) having a wavelength is suitably selected according to the purpose. Thus Nakamura expressly teach a semiconductor laser as an example. Nakamura does not provide extensive details (*e.g.*, the laser stability over the normal range of operating temperatures) of the semiconductor laser. Since Nakamura does not disclose and/or require a specific semiconductor laser, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified semiconductor laser of Nakamura as any one of the known conventional semiconductor lasers that would not require further description. Further, Bradley teaches (column 1, line 64 to column 2, line 2) that even the <u>best stabilized</u> lasers have a drift of about 50 Å over the normal range of operating temperatures. Thus, Bradley provides *prima facie* evidence that lasers

(*e.g.*, the unspecified semiconductor laser of Nakamura) have a wavelength drift over the normal range of operating temperatures. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention provide a known conventional semiconductor laser (*e.g.*, a stabilized semiconductor laser having a laser wavelength located at the maximum of the stimulation spectrum and wherein the laser wavelength drifts ≤5 nm with operating temperature, in order to optimize photostimulation of the radiation image converter panel) as the unspecified semiconductor laser in the apparatus of Nakamura.

Appellant argues (first two paragraphs on pg. 14) that cited prior art does not teach or suggest a relationship between a change in intensity of the stimulable emission and the change in wavelength of the stimulating light. Examiner respectfully disagrees. As discussed above, both Nakamura and Neyens *et al.* teach or suggest that the "rate of change of the intensity of the stimulated emission to a given change of the wavelength of the stimulating light is not larger than 1.0%/nm and is not smaller than -1.0%/nm" within ±2.5 nm of a stimulating spectrum maxima (*i.e.*, $\lambda_{s\text{-}max}$). Therefore, the combination of the cited prior art teach or suggest the claimed invention.

Issue B (arguments on pg. 14 of appeal brief filed 24 May 2007):

Appellant argues that claim 3 is patentable over the applied art because Research Disclosure 308117 fails to cure the defects noted in the combined teachings of Nakamura, Neyens *et al.* and Bradley with regard to claim 1. Examiner respectfully disagrees for the reasons discussed above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

SL
14 August 2007

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